



NON-TITLE V TECHNICAL SUPPORT DOCUMENT

PERMIT NUMBER:	150063	App. ID(s):	413816
BUSINESS NAME:	Shutterfly, Inc.	Revision(s):	0.1.0.0
SOURCE TYPE:	Graphic Arts	Revision Type(s):	Non-minor modification
PERMIT ENGINEER:	Lizabeth Gomez	Date Prepared:	08/31/2016

BACT: Yes	40 CFR Part 63/61 : No	40 CFR Part 60 : No	SYNTH MINOR: No	AIRS: No
DUST PLAN REQUIRED:	No	DUST PLAN RECEIVED:	No	
O&M PLAN REQUIRED:	Yes	O&M PLAN RECEIVED:	Yes	
PORTABLE SOURCE:	No	SITE VISIT:	No	

PROCESS DESCRIPTION:

Shutterfly, Inc. is a graphic arts facility in Tempe, AZ. Shutterfly conducts digital printing using HP Indigo Digital Printing Presses, which use custom electrophotographic ink. The paste-like ink is extracted from tubular cartridges and suspended in non-polar hydrocarbon oil referred as imaging oil. Within the enclosed press, the volatile imaging oil carries the ink particles onto the photo imaging plate (PIP) drum and lays down the ink one color at a time onto the blanket roller. The image is transferred onto final substrate, once all the colors, cyan (C), magenta (M), yellow (Y), and black (K), have been laid down.

During the ink transfer from the PIP to the blanket roller, the imaging oil is flashed off and collected by an internal vapor recovery system. Each press is equipped with an external add-on chiller that supplies refrigerated water to the oil recycling system, in order to condense the captured vapors. The imaging oil is separated from any condensed water via gravitation and either reused to dilute inks or reclaimed to be shipped as waste. The oil recycling system reduces the facility's need for additional imaging oil, thus minimizing the volatile organic compounds (VOC) emitted.

In addition to the HP Indigo Digital Printing Presses, the facility has digital inkjet printers (Kirk Rudy), UV coaters (Harris Bruno & Tec Lighting) and a case binding machine (Muller Horauf), which use inks, coatings and adhesives that contain some VOC and hazardous air pollutants (HAP).

PERMIT HISTORY:

Date Received	Revision Number	Description
07/06/2015	0.0.0.0	Submitted application for a new Non-Title V permit for a graphic arts operation in Tempe, AZ.
07/05/2016	0.1.0.0	Non-minor modification to add 12 HP Indigo 10000 Digital Printing Presses.

PURPOSE FOR APPLICATION: The purpose for this non-minor modification is to add 12 new digital printing presses. Since the facility was issued a new permit less than a year ago with emissions limits below the BACT threshold, the PTE from the new presses as well as from the existing presses will be included in the case-by-case determination for BACT.

A. APPLICABLE COUNTY REGULATIONS:

Rule 100: General Provisions and Definitions

Rule 200: Permit Requirements

Rule 220: Non-Title V Permit Provisions

Rule 241: Minor New Source Review (NSR)

Rule 280: Fee Table A (Printing Facilities \geq 25 TPY Potential Uncontrolled VOC & Source subject to BACT determination)

Rule 300: Visible Emissions

Rule 337: Graphic Arts

All of the facility's graphic arts operations fall under the partial exemption of Rule 337 §103.2 since the Permittee only performs digital printing and radiation-cured coating. As a result, the source is exempt from the VOC limits of Rule 337 and only the work practices listed in §306 and the recordkeeping requirements in §502.5 apply.

B. APPLICABLE FEDERAL REGULATIONS:

Based on the information provided in the permit application, the facility is not subject to any federal regulations.

C. AIR POLLUTION CONTROL EQUIPMENT/EMISSION CONTROL SYSTEM(s):

Each HP Indigo digital printing press operates with a process chiller. The chiller continuously supplies refrigerated water to the presses in order to regulate the ink and press temperature. The chiller also serves as an add on control system needed to condense and reclaim imaging oil and inks. Spent material is reclaimed with an oil recycling system incorporated into the HP Indigo digital printing presses. The oil recycling system works by condensing the oil and water vapors from the ambient air back into a liquid using the refrigerated water supplied by the chiller. The recycling system then separates the oil from the water using gravitation, where the water settles to the bottom while the imaging oil will accumulate on top of the water. The accumulated oil is reclaimed for reuse in the press or for off-site disposal. According to the manufacturer's specifications (Appendix C of HP Indigo 10000 Digital Presses Site Preparation Guide-US Edition), mass balance tests have shown the recycling system to have a capture efficiency of at least 84%.

The facility is required to comply and maintain an Operation and Maintenance (O&M) Plan for the chillers. Shutterfly submitted an O&M Plan on August 2015 for the Lauda Ultra Cool Chillers used by the HP Indigo 6000 and 7000 Series printing presses (14 units total). An O&M Plan for the 12 new TRESU Chillers, which will be used for the HP Indigo 10000 presses was submitted with this application on July 2016.

D. EMISSIONS:

Emissions for current equipment:

The Permittee submitted with this application their 12-month rolling total product usage and emissions for June 2015 through May 2016. Their emission calculations were based on a material balance for the total usage of all inks, oils, coatings, adhesives, cleaners, and any other VOC-containing materials. The mass balance approach assumes that the net amount consumed, the amount used minus the amount reclaimed for disposal, evaporated to the atmosphere. The net amount consumed was multiplied by the respective VOC content to determine the total VOC emitted.



12 month rolling total
by Shutterfly.pdf

Estimated emissions for new presses:

The emissions for the additional HP Indigo 10000 presses were estimated by extrapolating the current emissions, which are based on the production capacity of the current presses, by the production capacity increase for the new presses.



Estimated emissions
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Hazardous Air Pollutants:

According to the material list provided with this modification application, the source uses polyurethane adhesive that contains 1-5% of the hazardous air pollutant, methylene diphenyl diisocyanate (MDI). The worst case emissions for MDI, which assumes maximum concentration and complete volatility, would be 0.3 tpy based on a mass balance for the amount consumed.

Antifreeze

The chillers require the addition of antifreeze in order to prevent the chill water from freezing, which would damage parts of the system. Ethylene Glycol (CAS 107-21-1) is used for the LAUDA Ultra Cool Chillers and Propylene Glycol (CAS 57-55-6) is used for the TRESU Americas DPC4 v2015 Chillers. Since the lids of the chill tanks are always kept closed, there is minimal evaporation of solution. The evaporation losses can be estimated based on a mass balance on the difference between the amount of chill water added to each chiller and the amount of waste collected after flushing the chillers, which is routinely done on an annual basis.

According to the Permittee, all of the LAUDA Ultra Cool Chillers were flushed and drained when the source relocated from Phoenix to Tempe in the Summer of 2015. The waste shipments of chill water were 110 gallons on 06/09/2015, 55 gallons on 08/17/2015, and 275 gallons on 08/27/2015 for a total of 440 gallons. The amount of chill water needed to replenish all the drained chillers 501.6 gallons, resulting in a total loss of about 61.6 gallons of chill water. Since the chill water consists of 30% antifreeze, it can be assumed that of the solution lost 18.5 gallons was ethylene glycol, which corresponds to 173 lbs of ethylene glycol based its density of 9.36 lbs/gallon.

It is assumed that the TRESU Chillers would have a similar evaporation rate for propylene glycol. According to the manual, the 12 TRESU chillers have a capacity of 60 gallons each. Assuming a similar evaporation loss of 12.3% from the total 720 gallons of chill water, 88.6 gallons of chill water will evaporate consisting of 30% antifreeze, for a total of 230 lbs of propylene glycol based on its density of 8.67 lbs/gallon.

FACILITY-WIDE ALLOWABLE EMISSIONS

Pollutants	Printing Presses	Antifreeze	† Annual Emissions
	tpy	tpy	tpy
VOC	37.3	0.2	37.5
Any Single HAP	0.3	0.1	1.5
Total HAPs	0.3	0.1	3

† Limits were set to 1.5 tpy for any single HAP and 3 tpy for total HAPS to allow operational flexibility.

E. BEST AVAILABLE CONTROL TECHNOLOGY (BACT):

Since the annual emissions for VOC exceed the current BACT threshold limits of Rule 241, the Permittee is subject to BACT. BACT is defined as the most stringent limitation or control technique that is technologically feasible, cost effective, and has been achieved in practice for the applicable source. Per MCAQD policy, sources that choose control technologies for the same or similar source category accepted by the air quality management districts in California may forgo the top-down analysis.

Shutterfly provided engineering evaluations by the Bay Area Air Quality Management District (BAAQMD), which determined that the HP Indigo 6000 and 7000 model presses complied with BACT. In these evaluations, the HP Indigo 6000 and 7000 model presses were pre-certified by BAAQMD for the purpose of qualifying the equipment for the agency's accelerated permitting program pursuant to Regulation 2-1-415. As part of the pre-certification evaluation a BACT analysis was provided for each press. Two levels of BACT were considered: BACT 1, which is the most stringent control that is technologically feasible and cost effective, and BACT 2, which is the most effective control already achieved in practice. The following measures were considered for BACT 1:

1. Use of water based inks with low VOC content
2. Emissions collected and vented to a control device, such as thermal oxidizer or carbon adsorber

The use of water based inks with low VOC content was deemed technology infeasible since the Indigo digital printing presses can only use custom HP ElectroInk, which is not compatible with water. A regenerative thermal oxidizer and carbon adsorber were not justified as cost effective based on the capital and operational cost of each unit per ton of pollutant reduced from each press.

With BACT 1 not feasible, BACT 2 was considered. However, since there are no BACT guidelines for digital printing, the BAAQMD's BACT 2 guideline for rotogravure printing was used instead. BACT 2 for rotogravure printing is to collect and vent to a control device in order to achieve an overall emissions reduction that would bring the VOC content to less than 2.5 pounds per gallons.

The HP Indigo digital printing presses are able to meet this BACT 2 requirement based on the performance test conducted for the BAAQMD's pre-certification. The tests demonstrated that the recycling system for the presses reclaimed about 90% of the VOC used.



BAAQMD Engineering
Evaluation.zip

BACT Determination:

Based on the BACT analysis by BAAQMD and the effective abatement demonstrated, MCAQD will accept an overall capture and control efficiency of at least 80% for the recycling system in the HP Indigo digital printing presses as BACT, which is the minimum abatement efficiency required by Rule 337 §303.3, Table 337-4.

F. MINOR NEW SOURCE REVIEW (NSR):

Per Rule 241, new sources with a potential to emit (PTE) equal to or greater than the permitting threshold (Rule 100 §200.88) or existing sources that make a minor NRS modification must be evaluated for the possibility that the source could interfere with attainment or maintenance of a national ambient air quality standard (NAAQS). Although the facility-wide VOC emissions are greater than the *Minor NSR Modification* thresholds of Rule 100 §200.71, per MCAQD's Air Dispersion Modeling Guidelines (June 27, 2016), the source is not required to perform the ambient air quality impact assessment of Rule 241 §303 for VOC due to the lack of screening tools currently available for ozone modeling.

G. HAP EMISSION IMPACTS:

Screen modeling was performed for MDI (CAS 101-68-8) per the MCAQD HAP Permitting Technical Guidance (TG-2011-001; issued on 10/31/2011). The modeling was performed using BREEZE AERSCREEN. MDI was modeled using a volume source based on estimated building dimensions. Based on the Accessor's map, the length and width of the building are 455 feet and 350 feet, and the distance from the center of the building to the nearest property line is 210 feet. Using best engineering judgement, the building height was assumed to be 40 feet. The MDI emission rate was based on the allowable emission rate for any single HAP and 5,723 hours of operation per year.

The screen model's raw output data is located in the Appendix. In the table below the maximum 1-hour and scaled annual concentrations at the nearest property line were compared to the Acute and Chronic Ambient Air Concentrations levels.

COMPARISON OF HAP CONCENTRATIONS

Pollutant	¹ Ambient Air Concentrations (mg/m ³)		Screen Model Results (mg/m ³)		Higher than Ambient Air Concentration?	
	Acute	Chronic	Maximum 1-hr Conc.	² Scaled Annual Conc.	Acute	Chronic
MDI	2.5	6.00E-04	2.61E-02	2.61E-03	No	Yes

1. The CAAC is based on Reference Concentrations (RfCs) provided by the EPA's Integrated Risk Information System (IRIS). The AAAC is based on the level 2 Emergency Response Planning Guideline (ERPG), divided by two, developed by the American Industrial Hygiene Association.
2. AERSCREEN only calculates 1-hr concentrations, thus a scaling factor of 0.10 is used to estimate the annual concentration.

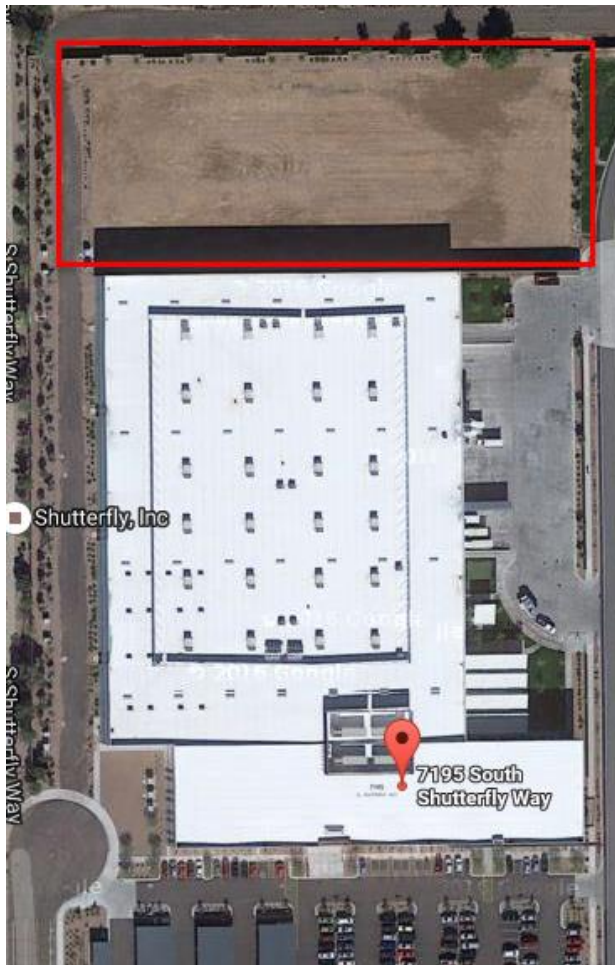
H. PERFORMANCE TESTING:

The facility does not have any emission control equipment or systems that require performance testing.

I. REGULATORY REQUIREMENTS AND MONITORING:

1. The allowable emissions in *Condition 1* were updated to account for the increase in emissions as a result of the addition of the 12 HP Indigo 10000 Digital Printing Presses. The emission limits were also updated to remove the daily VOC limit since Rule 241 no longer has daily BACT limits, as well as to include emission limits for any single HAP and total HAPs in order to keep the facility from exceeding the major source threshold for HAPs.

2. *Permit Condition 3* was updated to specify that the digital printing presses must be operated using the oil recycling system and its associated chiller to achieve, as BACT, an 80% VOC recovery during each 12-month rolling period.
3. *Permit Condition 4a* was updated to include the TRESU chillers as part of the O&M Plan requirements.
4. *Permit Condition 5* was slightly updated to also include recordkeeping requirements for HAPs and to specify how to calculate the percent of VOC recovered to demonstrate compliance with *Condition 3*.
5. *Permit Conditions 6 and 7* were added to restrict any routine dust generating operation on the unpaved 2-acre lot next to the facility (shown in the image below). According to the source, the lot will not be used by Shutterfly, except for foot traffic during an emergency evacuation or an annual evacuation drill.



APPENDIX:

12-Month Rolling Total Product Usage and Emissions

Shutterfly, Inc., 7195 S. Shutterfly Way, Tempe, Arizona																	May 2016									
Graphic Arts Materials					2015							2016					12-Month Rolling Total	Conversion Factor	12-Month Rolling Usage (Gal/Yr)	12-Month Rolling Usage (Lbs/Yr)	12-Month Rolling Waste (Gal/Yr)	12-Month Rolling Usage Net (Gal/Yr)	VOC Content (Lbs/Gal)	12-Month VOC Emissions (Lbs/Yr)	101688 Methylene diphenyl diisocyanate (MDI)*	
Item #	Item Description	Org	Spec. Gravity	Units	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	Units/Year							(%)	(Lbs/Yr)	
10-1002-02	UV Gloss Coating UV-9020 5 gallon 40# pail	PHX	1.080	5 Gal	48	43	56	94	99	86	50	49	76	56	50	51	3,790.0 Gal	1	3,790.0	34,137	0	3,790.0	0.00065	2	0%	0
10-1004-02	Coating 3.2% Sapphire 55 Gal Drum P5753	PHX	1.01	55 Gal	1	0	0	3	5	3	4	1	1	2	1	2	1,265.0 Gal	1	1,265.0	10,656	0	1,265.0	0.0100	13	0%	0
10-1008-01	UV matte coating UV-9790 5 gallon 40# pail	PHX	1.043	5 Gal	7	16	5	7	5	7	4	2	3	8	8	7	395.0 Gal	1	395.0	3,437	0	395.0	0.080	32	0%	0
10-1011-04	Agent HP Recycling Case Q4315A 7xxx	PHX	0.79	4 Liters	6	6	8	21	18	21	19	6	7	17	16	11	624.0 Liters	0.264	164.8	1,086	115	49.3	6.59	325	0%	0
10-1011-05	Oil HP Imaging Case Q4313A 7xxx	PHX	0.77	16 Liters	14	54	55	79	102	165	93	35	20	49	53	69	12,608.0 Liters	0.264	3,330.7	21,389	2334	997.1	6.43	6,411	0%	0
10-1012-03	Ink HP Black Case Q4133A 7xxx	PHX	0.819	7.6 Liters	42	26	49	91	68	88	119	51	39	44	45	60	5,487.2 Liters	0.264	1,449.6	9,901	1016	434.0	5.33	2,313	0%	0
10-1012-04	Ink HP Calibration Black Case Q4137B 7xxx	PHX	0.819	1.56 Liters	0	2	0	2	0	1	1	0	0	1	0	1	12.5 Liters	0.264	3.3	23	2	1.0	5.33	5	0%	0
10-1013-03	Ink HP Cyan Case Q4132A 7xxx	PHX	0.815	7.6 Liters	43	54	60	138	114	150	214	118	103	105	138	137	10,442.4 Liters	0.264	2,758.6	18,750	1933	825.8	5.30	4,377	0%	0
10-1013-04	Ink HP Calibration Cyan Case Q4136B 7xxx	PHX	0.815	1.56 Liters	1	3	1	0	0	2	0	0	1	0	1	0	14.0 Liters	0.264	3.7	25	3	1.1	5.30	6	0%	0
10-1014-03	Ink HP Magenta Case Q4131A 7xxx	PHX	0.817	7.6 Liters	45	56	60	140	109	148	228	122	102	103	137	137	10,541.2 Liters	0.264	2,784.7	18,974	1951	833.7	5.39	4,493	0%	0
10-1014-04	Ink HP Calibration Magenta Case Q4135B 7xxx	PHX	0.817	1.56 Liters	1	2	1	2	0	0	0	0	0	1	1	0	12.5 Liters	0.264	3.3	22	2	1.0	5.39	5	0%	0
10-1015-03	Ink HP Yellow Case Q4130A 7xxx	PHX	0.818	7.6 Liters	8	53	58	127	104	143	208	111	93	103	123	125	9,545.6 Liters	0.264	2,521.7	17,203	1767	754.9	5.18	3,910	0%	0
10-1015-04	Ink HP Calibration Yellow Case Q4134B 7xxx	PHX	0.818	1.56 Liters	1	3	0	0	0	0	0	0	0	1	0	0	7.8 Liters	0.264	2.1	14	1	0.6	5.18	3	0%	0
10-1018-03	Imaging Agent HP Each Q4314A 7xxx	PHX	0.819	1 Liters	5	13	16	46	29	48	46	24	21	26	23	33	330.0 Liters	0.264	87.2	595	61	26.1	5.14	134	0%	0
10-1032-01	Adhesive Protein Case Making	PHX	1.1	66 Lbs.	31	19	6	46	16	17	69	14	13	13	12	12	17,688.0 Lbs.	0.109	1,928.1	17,688	110	1818.1	0.00	0	0%	0
10-1033-05	Purmel QR 2580, 40 lbs. pail	PHX	1.2	40 Lbs.	11	7	5	12	13	8	9	10	5	5	9	8	4,080.0 Lbs.	0.100	407.7	4,080	0	407.7	0.00	0	5%	204
10-1033-06	Purmel QR 2580, 37.4 lbs. slug	PHX	1.2	37.4 Lbs.	4	14	11	26	24	22	27	19	18	17	16	18	8,078.4 Lbs.	0.100	807.2	8,078	1	806.2	0.00	0	5%	403
10-1033-07	Technomelt PUR 3317 BR Bulk, 40 Lbs. 2Kg Slug	PHX	1.2	40 Lbs.	0	0	0	0	0	11	39	14	11	19	1	14	4,360.0 Lbs.	0.100	435.7	4,360	0	435.7	0.00	0	0%	0
10-1071-01	Ink Bulk Black Dye (775ML) 4030, CA862 Series	PHX	0.950	0.775 Liters	2	0	0	0	0	2	0	2	0	0	0	0	4.7 Liters	0.264	1.2	10	0	1.2	2.00	2	0%	0
10-1072-01	Ink Bulk Cyan Dye (775ML) 4030, CQ863 Series	PHX	0.950	0.775 Liters	5	0	0	0	0	1	1	1	0	0	0	0	6.2 Liters	0.264	1.6	13	0	1.6	2.02	3	0%	0
10-1073-01	Ink Bulk Magenta Dye (775ML) 4030, CQ864 Series	PHX	0.950	0.775 Liters	0	0	0	0	0	0	0	0	0	0	0	0	0.0 Liters	0.264	0.0	0	0	0.0	2.03	0	0%	0
10-1074-01	Ink Bulk Yellow Dye (775ML) 4030, CQ865 Series	PHX	0.950	0.775 Liters	2	2	0	0	0	0	0	1	0	0	0	0	3.9 Liters	0.264	1.0	8	0	1.0	2.04	2	0%	0
60-1019-01	Alcohol IPA (16 oz.)	PHX	0.789	16 Oz	38.7	39.6	44	47.3	48.4	51.6	57.4	32	40	55	44	48	8,736.0 Oz	0.0078	68.3	449	54	14.4	6.57	94	0%	0
60-1019-01	Alcohol IPA (1 gal)	PHX	0.789	1 Gal	12	2	12	8	18	9	22	16	11	11	14	20	155.0 Gal	1	155.0	1,020	122	32.6	6.57	214	0%	0
60-1019-02	Alcohol IPA (5 gal)	PHX	0.790	5 Gal	2	0	2	1	2	4	2	1	1	2	3	5	125.0 Gal	1	125.0	824	99	26.3	6.589	173	0%	0
Days of Operation					23	26	27	27	24	26	24	27	26	31	30	28	319 Days		22,490	172,743	9,571	12,919		22,521	Lbs/Yr	607
Hours of Operation					444	407	504	444	564	540	552	420	444	492	456	456	5,723 Hours							11.3	Tons/Yr	0.30

Waste Shipments					2015							2016					12-Month Rolling Total
Item #	Waste Description	Org	S.G.	Units	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	
	Waste Ink & Imaging Oil	PHX	0.82	1 Gal	770	605	990	0	1,515	1,305	1,250	0	750	750	750	500	9,185 Gal
	IPA w/UV Coating	PHX	0.79	1 Gal	0	0	55	0	55	55	0	55	0	0	0	55	275 Gal
	Waste Glue	PHX	1.2	1 Gal	0	0	0	0	110	0	0	0	0	0	0	0	110 Gal
9,570 Gal																	

Pollutant	Annual Permit Limit	Actual Emissions	Units	Within Permit Limit?
VOCs	18.67	11.3	Tons/Yr	Yes
VOCs	120	70.6	Lbs/Day	Yes
HAPs	None	0.30	Tons/Yr	Yes

* MDI is a Hazardous Air Pollutant (HAP) per Maricopa County and EPA regulations. MDI emissions based on mass balance, maximum concentration, and 100% volatility (worst case).

Estimated Emissions of New Equipment

Shutterfly, Inc., 7195 S. Shutterfly Way, Tempe, Arizona

Existing HP 6000 & 7000 Series Presses - Operations, Production, Chemical Usage and Emissions												
Air Permitted Equipment List Units #	Item Description	# of HP Press Units	Operating Hours Per Unit (Hrs/Yr)	Average Format Per Unit (in ²)	Average Speed Per Unit (Pg/Hr)	Maximum Product Produced (in ² /Yr) (see detail below)	Annual Chemical Usage in HP 6000/7000's (Lbs/Yr)	Annual Chemical Usage in HP 6000/7000's (Gal/Yr)	Annual Waste Ink/Oil Generation from HP 6000/7000's (Gal/Yr)	Annual Net Chemical Usage in HP 6000/7000's (Gal/Yr)	Chemical Usage per Square Inch of Production Available in HP 6000/7000's (Gal/in ²)	VOC Emissions per Square Inch of Production Available in HP 6000/7000's (Lbs/in ²)
1a, 1b, 2a, 2b, 2c, 3a, 3b, 3c, 3d, 4a, 5a, 5b, 6a & 6b	HP Indigo 6000 and 7000 Series Presses	14	5,723	646	1800	93,165,861,600	13,110	87,984	9,185	3,925	4.21E-08	2.36E-07

New HP 10000 Series Presses - Equivalent Operations, Production, Chemical Usage and Emissions/Inch Produced												
Air Permitted Equipment List Units #	Item Description	# of Units	Operating Hours (Hrs/Yr)	Format (in ²)	Speed (Pg/Hr)	Maximum Product Produced (in ² /Yr)	Estimated Annual Chemical Usage in HP 10000's (Lbs/Yr)	Estimated Annual Chemical Usage in HP 10000's (Gal/Yr)	Estimated Annual Waste Ink/Oil Generation from HP 10000's (Gal/Yr)	Estimated Annual Net Chemical Usage in HP 10000's (Gal/Yr)	Estimated VOC Emissions from HP 10000's (Lbs/Yr)	Estimated VOC Emissions from HP 10000's (Tons/Yr)
30A, 30B, 30C, 30I, 302, 303, 304, 305, 306, 307, 308 & 309	HP Indigo 10000 Series Presses	12	5,723	585	3450	138,605,337,000	19,504	130,896	13,665	5,839	32,707	16.4

Existing Equipment - Production Capacity Detail					
Unit Type	Units	Operations (Hrs/Yr)	Format (in ²)	Speed (Pg/Hr)	Max. Production (in ² /Yr)
HP Indigo 6000	2	5723	481	1800	9,909,946,800
HP Indigo 6600	3	5723	481	1800	14,864,920,200
HP Indigo 7200	4	5723	963	1800	39,680,992,800
HP Indigo 7250	1	5723	963	1800	9,920,248,200
HP Indigo 7500	2	5723	456	1800	9,394,876,800
HP Indigo 7600	2	5723	456	1800	9,394,876,800
Totals	14				93,165,861,600

Existing VOC Emissions, All Operations	22,521	11.3
New Emission Estimate, All Operations	55,227	27.6
Growth Factor over Next 5 Years	35%	35%
New Emissions Estimate w/Growth Factor	74,557	37.3

TITLE: 150063 MDI

***** VOLUME PARAMETERS *****

SOURCE EMISSION RATE: 0.0717 g/s 0.569 lb/hr
 VOLUME HEIGHT: 6.10 meters 20.00 feet
 INITIAL LATERAL DIMENSION: 28.29 meters 92.80 feet
 INITIAL VERTICAL DIMENSION: 5.67 meters 18.60 feet
 RURAL OR URBAN: URBAN
 POPULATION: 4000000
 INITIAL PROBE DISTANCE = 325. meters 1066. feet

***** BUILDING DOWNWASH PARAMETERS *****

BUILDING DOWNWASH NOT USED FOR NON-POINT SOURCES

***** PROBE ANALYSIS *****

25 meter receptor spacing: 64. meters - 325. meters

Z0 SECTOR	ROUGHNESS LENGTH	1-HR CONC (ug/m3)	DIST (m)	TEMPORAL PERIOD
1*	1.000	26.09	64.0	WIN

* = worst case flow sector

***** MAKEMET METEOROLOGY PARAMETERS *****

MIN/MAX TEMPERATURE: 277.6 / 322.0 (K)

MINIMUM WIND SPEED: 0.5 m/s

ANEMOMETER HEIGHT: 10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Urban
 DOMINANT CLIMATE TYPE: Dry Conditions
 DOMINANT SEASON: winter

ALBEDO: 0.35
 BOWEN RATIO: 2.00
 ROUGHNESS LENGTH: 1.000 (meters)

METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O	LEN	Z0	BOWEN	ALBEDO	REF	WS
10	01	10	10	01	-1.32	0.043	-9.000	0.020	-999.	21.	6.1	1.000	2.00	0.35	0.50		
HT	REF	TA	HT														
10.0	322.0	2.0															

METEOROLOGY CONDITIONS USED TO PREDICT AMBIENT BOUNDARY IMPACT

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YR MO DY JDY HR
-- -- -- -- --
10 01 10 10 01

H0      U*      W*      DT/DZ  ZICNV  ZIMCH  M-O  LEN      Z0      BOWEN  ALBEDO  REF  WS
-----
-1.32   0.043  -9.000   0.020  -999.   21.    -    6.1  1.000   2.00   0.35   -    0.50

HT      REF  TA      HT
-----
10.0    322.0   2.0
  
```

***** AERSCREEN AUTOMATED DISTANCES *****
 OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE

DIST (m)	MAXIMUM 1-HR CONC (ug/m3)	DIST (m)	MAXIMUM 1-HR CONC (ug/m3)
64.01	26.09	200.00	3.983
75.00	20.20	225.00	3.272
100.00	12.61	250.00	2.743
125.00	8.717	275.00	2.339
150.00	6.437	300.00	2.022
175.00	4.978	325.00	1.769

***** AERSCREEN MAXIMUM IMPACT SUMMARY *****

CALCULATION PROCEDURE	MAXIMUM 1-HOUR CONC (ug/m3)	SCALED 3-HOUR CONC (ug/m3)	SCALED 8-HOUR CONC (ug/m3)	SCALED 24-HOUR CONC (ug/m3)	SCALED ANNUAL CONC (ug/m3)
FLAT TERRAIN	26.09	26.09	23.48	15.65	2.609
DISTANCE FROM SOURCE	64.01 meters				
IMPACT AT THE AMBIENT BOUNDARY	26.09	26.09	23.48	15.65	2.609
DISTANCE FROM SOURCE	64.01 meters				



NON-TITLE V COMPLETENESS DETERMINATION CHECKLIST

Items 1-15 Front page: Items 1 to 15 (14 for Renewals) must be completed.

Notes to engineer:

- For renewal applications the source must either answer 'No' to questions 2-5 or submit an application for a permit modification.
- Item 8: Many applicants do not know the SIC code or NAICS code for their industry. For a new application the code can be obtained by doing an on-line search. <http://www.osha.gov/pls/imis/sicsearch.html>
- Items 5, 7 and 14: These may be the same for many applicants.

Complete: ☒ Incomplete: ☐

Item 16: A simple site diagram has been included, preferably on a standard size paper. Detailed blueprints or construction drawings are not required.

Complete: ☒ Incomplete: ☐ N/A: ☐

Item 17: A simple process flow diagram on a standard size paper is preferred. A process flow diagram may not be needed for some small businesses.

Complete: ☒ Incomplete: ☐ N/A: ☐

Item 18: An O&M plan is required only for a control device. An O&M plan is not required for a spray booth. Instead of including the O&M plan with the application, an applicant may submit it after receiving the permit.

Complete: ☒ Incomplete: ☐ N/A: ☐

Item 19: A dust control plan, if required, must accompany the permit application. The plan will be reviewed and approved by the dust compliance group.

Complete: ☐ Incomplete: ☐ N/A: ☒

Item 20: The applicant needs to complete only those sections of the permit application that are applicable.

Complete: ☒ Incomplete: ☐ N/A: ☐

Notes to engineer:

- Concerning Section Z: Many applicants will not be able to perform these engineering calculations. We will accept the permit application with a blank Section Z.

Instructions for completing Sections A, B, C, D, E-1, E-2, F, G, H, I, J, K-1, K-2, K-3, K-4, L, M, X-1, X-2, Y and Z of the permit application are included at the beginning of each section and are self-explanatory.

In general, a material safety data sheet (MSDS) is required for each chemical used, stored or processed at the facility. Exceptions are for very common materials, such as gasoline, diesel, acetone, etc.

Business name: Shutterfly, Inc.

Permit number: 150063

Completeness review completed.

Application determined to be:

Complete: ☒ Incomplete: ☐

Permit Engineer: Lizabeth Gomez

Date: 08/29/2016